SERVICE MANUAL

COMMODORE
Video – Monitor
1901

commodore
COMPUTERS

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SPECIFICATIONS

Type	:	Color video monitor
Colour	:	PAL/RGB I
Power requirements	:	AC 220 – 240 V, 50 Hz
Power consumption	:	60W
Screen size	:	14" (36 cm)
		90° deflection angle
Audio output	:	1 W
Speaker	:	10 cm x 10 cm
External input terminals		
Video input		
Input type	:	Composite video signal (CVBS)
Input level	:	1.0 Vp-p (sync negative 0.3 V)
Input impedance	:	75 Ω
Connector type	:	RCA pin jack
Commodore video input		
1) Luminance signal input		
Input type	:	Composite video signal (VS)
Input level	:	1.0 Vp-p (sync negative 0.3 V)
Input impedance	:	75 Ω
Connector type	:	RCA pin jack
2) Chrominance signal input		
Input type	:	PAL chroma signal
Input level	:	1.0 Vp-p
Input impedance	:	75 Ω
Connector type	:	RCA pin jack
R-G-B input		
Input type	:	D-9
Input level	:	0V/5Vp-p
Input impedance	:	470 Ohms
Audio input		
Input level	:	1.0 Vp-p
Input impedance	:	10 k Ω
Connector type	:	RCA pin jack
Dimensions	:	345 (W) x 360 (H) x 370 (D) mm
Weight	:	Unit weight: 9.5 Kg
		Gross weight: 10 Kg

Design and specifications subject to change without notice.

SAFETY PRECAUTION

1. The design of this product contains special hardware many circuits and components specially for safety purposes. For continued protection, no change should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.

2. Alterations of the design or circuitry of receiver should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.

3. Many electrical and mechanical parts in monitor sets have special safety related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the part list of Service manual. Electrical components having such features are identified by shading on the schematics and by (⚠) on the parts list in Service manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list in Service manual may create shock, fire or other hazards.

4. If any repair has been made to the chassis it is recommended that the power supply be checked or adjusted (see ADJUSTMENT OF A1 POWER SUPPLY).

5. The high voltage applied to the picture tube must conform with that specified in Service manual. Excessive high voltage can cause an increase in X-ray emission arcing and possible component damage therefore operation under excessive high voltage conditions should be kept to a minimum or should be prevented. If severe arcing occurs; remove the AC power immediately and determine the cause by visual inspection (incorrect installation cracked or melted high voltage harness, poor soldering etc). To maintain the proper minimum level of soft X-ray emission components in the high voltage circuitry including the picture tube must be the exact replacements or alternative provided by the manufacturer of the complete product.

6. Do not check high voltage by drawing an arc. Use high voltage meter or a high voltage probe with a VTVM. Discharge the picture tube before attempting meter connection, by connecting a clip lead to the ground frame and connecting the other end of the lead through a 10KΩ 2W resistor to the anode button.

7. When service is required, observe the original lead dress. Extra precautions should be given to assure correct lead dress in the high voltage circuit area. Where a short circuit has occured, those components that indicate evidence of overheating should be replace. Always use the manufacturer's replacement components.

8. ISOLATION CHECK
(SAFETY FOR ELECTRICAL SHOCK HAZARD)

After re-assembling the Product, always perform an isolation check on the exposed metal parts of the cabinet ('D' – subminiature connectors, video phono jacks, metal cabinets, screwheads, sound phono jack, control shafts, etc) to be sure the product is safe to operate without danger of electrical shock.

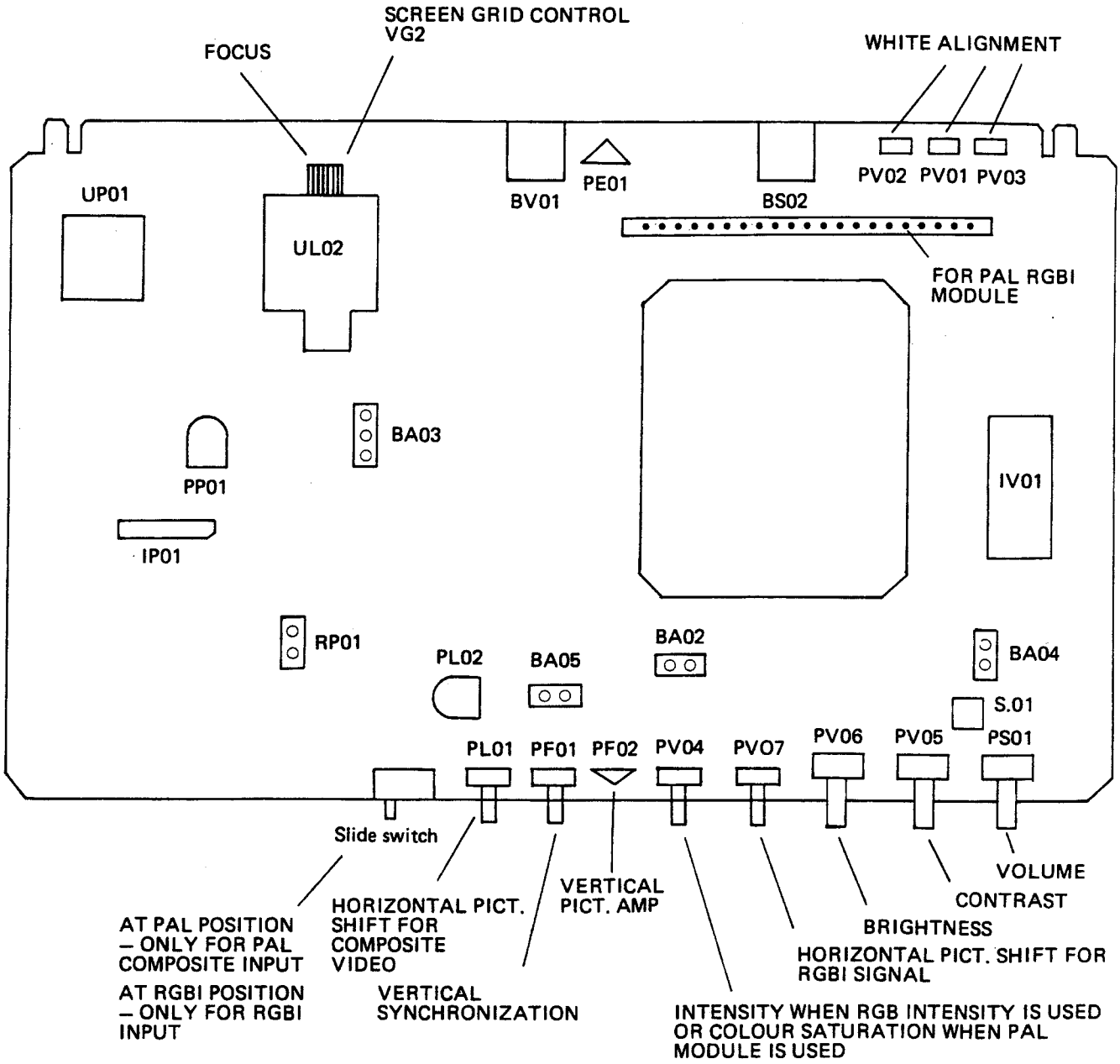
1) Dielectric Strength Test

The isolation between the AC primary circuit and a metal parts exposed to the user particularly any exposed metal part having a return path to the chassis should withstand a voltage of 1,100V AC (r.m.s.) for a period of one second. This method of test requires a test equipment not generally found in the service trade.

2) Leakage Current Check

Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check). Using a "Leakage Current Tester" measure the leakage current from each exposed metal part of the cabinet particularly any exposed metal part having return path to the chasis to a know good earth ground (water pipe, etc). Any leakage current must not exceed 0.7mA.

CHASSIS LAYOUT



ALIGNMENT PROCEDURE

Setting a) Connect AC power and assure that in within the operating rates.

b) Connect a correctly adjusted color computer to the rear input connector and set the slide switch for the computer being used.

A) A2 Voltage Adjustment

1) set brightness, contrast, intensity control min.

2) measure the DC voltage (A2) of cathodes at DP10 and chassis ground.

3) adjust PP01 to 114 voltage ± 1%

B) Horizontal Frequency Adjustment

1) Brightness : Background just back
Contrast : 50%
Intensity : Maximum

2) Picture tube must be facing East direction

3) Set should be carried out in the same magnetic field as its final destination (Equatorial or Southern Magnetic field)

4) Test point ◈4 is shorted to ground

5) Adjusted PL02 until the Picture is close to synchronization or the free running horizontal frequency = 15626 Hz ± 50 Hz.

C) Vertical Frequency Adjustment

1) Inject a 46 Hz signal into TP ◈4

2) Adjust PF01 for the black bar on the raster to be almost stationary or vertical frequency = 46 Hz ± 0.2 Hz.

D) Horizontal and Vertical Shifting Adjustment.

1) Adjust PL01 until picture is centralised at PAL composite mode.

2) Adjust PV07 until picture is centralised at RGBI mode.

E) Vertical Amplitude

Adjust PF02 such that the 3 reference lines on the top of the screen disappear.

F) Intensity Control

Adjust PV04 for intensity control (in this Alignment Procedure Intensity Control must be set to maximum)

G) Focus

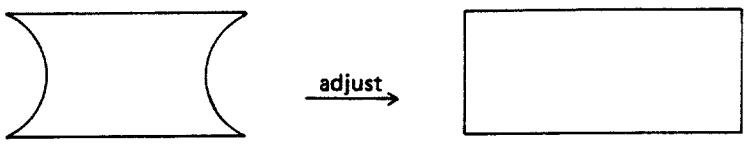
1) Display a pattern of characters on the screen

2) Adjust focus knob on the flyback transformer UL02 for the best focus at screen edge on the diagonal axis.

H) Geometrical Distortion

1) Set up a crosshatch pattern on the screen

2) Pin cushion correction.
Align PE01 for the extreme vertical lines on the right and left side of screen.



I) Screen Cut-Off

1) measure DC voltage at collector of TV50, TV60 and TV70
2) select the stage with the highest voltage
3) adjust screen voltage (VG2) to 170 V ± 2V

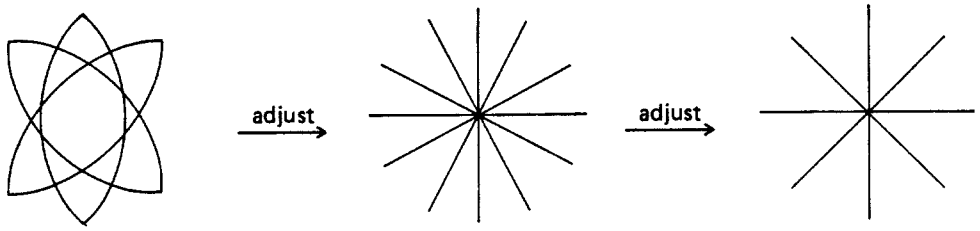
J) White Colour Adjustment

1) Set up a 40% white raster on the centre of the screen.
2) For RGBI signal level must be 4.4V to 5V at 390 termination.
3) Set PV01 (green) and PV02 (blue) to minimum position
4) Monitor wavefrom at collector at TV50 (red)
5) At intensity minimum, adjust contrast and brightness for maximum amplitude before clamping
6) Adjust PV03 (red) to have 62V ± 2V pp
7) Monitor white color temperature with detector probe head attached to the screen surface over the white pattern
8) Adjust PV01 (green) and PV02 (blue) for white color temperature of 7500k.

K) PAL/RGBI Decode Alignment

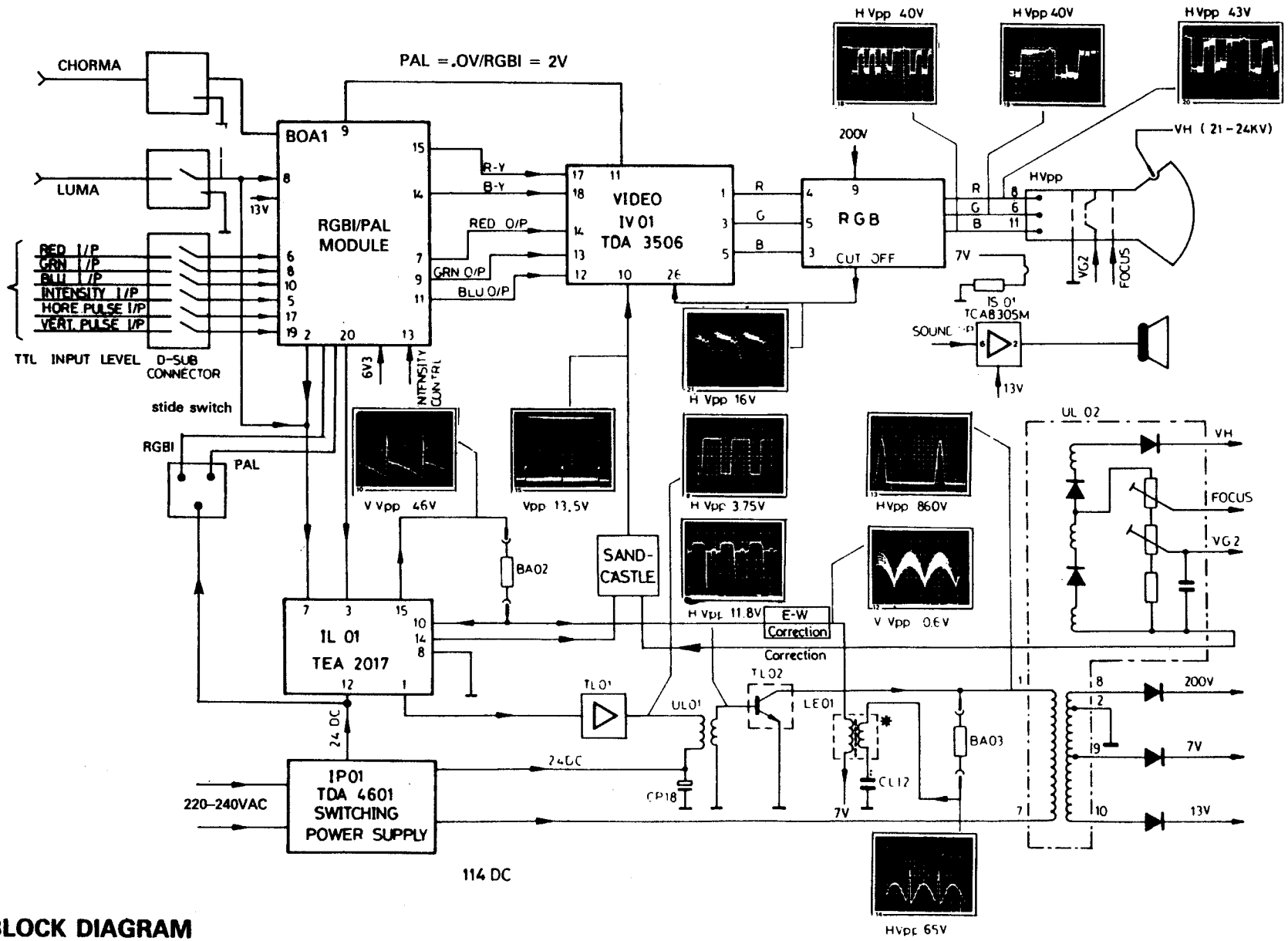
At PAL position

1) Receive the PAL standard colour bar signal
2) Connect a jumper clip between TP ④ and TP ⑤
3) Set the oscilloscope to X-Y range and connect its X probe to terminal 2 (B-Y) and its Y probe to terminal 3 (R-Y)
4) Connect a jumper clip between TP2 and TP3, apply bias +4.5 to TPI
5) Adjust CC14 slightly so that the colour becomes unlocked and the loops of the displayed Lissajoas figure appear on the scope
6) Adjust PC01 for the absence of the loops and adjust LC05 so that each pair of lines merge together.
7) Adjust CC14 to just regain floating colour synchronization i.e. oscillator frequency = 4,433619 Mhz ± 30 Hz.
8) Trim PC01 and LC05 slightly such that all the points merge together and the absence of venetian blinds on the screen pattern is necessary.



At RGBI Position

No alignment is necessary



BLOCK DIAGRAM

TECHNICAL DESCRIPTION

SWITCH MODE POWER SUPPLY

The SMPS works from 220 AC to 240 AC at both 50 Hz and 60 Hz frequency with an output power of 50 watts. The output voltages available are 114V and 24V. The 114V is used for the line output stage whereas the 24V is used for the oscillators, line driver stage and video processing stage. The supplies for sound, heater and video output amplifier are then tap from the output line transformer.

The AC mains voltage is applied to line filter LP01 via an on-off switch and a fuse which provides overload protection. This voltage is then rectified by DP01 to DP04 and partially filtered by CP04. The resulting DC voltage then acts as a supply voltage for switching transistor TP01 which is controlled by IC TDA 4601.

During start-up time, the IC 4601 is supplied from the mains through RP12. However, in normal operation, the voltage will be tap from windings 11/9 of the switch mode transformer. For low input supply voltage, the switch on time will be delayed by resistor RP12, hence a speed up circuit is necessary. This comprised of transistor TP02 and its surrounding components.

The variation of output voltage is simulated by the feedback control winding 1/9. This voltage is rectified by DP05 and applied to the amplifier input pin 3 of control IC. It will be compared with the reference voltage of 4V at pin 1 and the error voltage produced is amplified and converted to pulse width modulation in the IC. This will in turn drive the switching transistor TP01 at pin 7. The amount of base current is determine by RP11 between pin 7 and pin 8.

The divider RP08, RP09, RP19 at pin 5 monitors the unregulated DC voltage and hence the AC input. If the input is lower than 80V, the voltage at pin 5 will be lower than 2 volt and the IC will subsequently go into standby operation. This is to avoid operation at too low a supply voltage.

The collector current is simulated by an external RC combination of CP07, RP07, RP20 at pin 4. The voltage is clamped at 2V and the sawtooth rising AC voltage can vary up to 4V. This is the maximum limit of collector current which will trigger the IC for safety operation. The purpose of this is to prevent overloading of collector current. At pin 2, the zero crossing of the output AC is monitored for setting the reference of the base drive pulse of TP01.

The secondary pulses from winding 2/6 and 4/6 are then rectified and filtered before supplying to the other stages of the set.

HORIZONTAL AND VERTICAL SCAN CIRCUITS

The IC used for this function is IL01 TEA 2017. 2 supply voltages are required here; the higher 24V for the frame output drive and the lower 12V derived from the RC filter RP17, CP18 and regulator IL02 7812 for the oscillators circuits.

The input to the IC is composite signal via RL02, CL02 to pin 7. Provision for grounding the input is by BA05 (used when aligning the free running oscillator frequencies). The DC level at pin 7 is clamped by RL03 and RL04. Internally, the sync. separator will separate the video information and synchronization pulses, the slicing level of which is determine by RL05 and RL06.

Line flyback pulse is integrated by RL07, CL05 and subsequently coupled through CL06 to pin 3. The purpose is to compare with the input synchronizing pulse to obtain the correct triggering time for the line oscillation. The DC level at pin 3 is adjustable by PL01 to allow a small range of shifting in the picture. RL11 and CL09 determines the frequency of the free-running line oscillator and can be adjusted by PL02. RL10 controls the lock-in range.

The frame oscillator frequency is determine by RF01, CF01 and PF01 (adjustable). The components DF01, CF02, DF02 are used to double the supply voltage necessary for the frame deflection. Pin 15 is the frame output signal to drive the deflection coils, BA02. The S-correction required is achieved by CF06 and the DC feedback is obtained by RF04 and RF05 back into pin 10. PF02 controls the amplitude of the picture.

Pin 1 of the IC is the line pulse to drive transistor TL01. The collector voltage is step down via UL01 to provide sufficient base drive current for TL02 – switching transistor for the flyback transformer, UL02.

The collector of TL02 is connected to the deflection coils, BA03, which is driven by a linear sawtooth current to produce the necessary horizontal scan. Linearity of the horizontal scan is by LL01 and S-correction by CL12. CL11 is the tunning capacitor and determines the scanwidth.

The supply to the flyback transformer is the 114V rail from the switch mode power supply. A damping network of RL17, CL13 and LL02 is provided to reduce ringing on the picture. The secondary of the flyback transformer is tap and rectified, before going to the other stages of the set.

VIDEO AMPLIFIER

There are 3 similar stages of the video amplifier for the 3 electron guns. Basically, each consists of 3 transistors.

The video signal is coupled through CV50 and RV50 to TV50 Tr2SC2611, the gain of which is determined by the ratio between the feedback resistor RV52 and the parallel impedance of RV50, RV51 and CV50. CV50 is for frequency compensation, hence affects the amount of overshoot in the signal. As the 3 electron guns have different characteristics, this capacitor is chosen to suit each individual gun. TV81, having the biasing divider RV31, RV32 (in main board) acts as a constant current source for TV50. It provides the necessary biasing for TV50 and also determines the cut off voltage (RV31, RV32). It also provides the necessary low impedance required by the emitter of TV50. The emitter follower TV03 (on the main board), together with RV20, provides a low impedance to enable a fast rise in the signal and hence the switching ON of TV50. But when the input signal is low, TV50 will turn OFF and the collector voltage must rise rapidly. Due to the fact that RV56 is of 15k the time taken to rise will be delayed, hence, the active load, constituting of TV52, RV57 comes in use. Of course, enough base current must be provided by RV56 to turn ON TV52 and therefore pulling the emitter to high at a much shorter time, via RV57 and CE of TV52. DV50 is just to provide the return path when the transistor TV50 is turned ON again.

The 3 cut-off points for the 3 electron guns must not change with time such that correct black and white level is maintained. However, drift in characteristics is inevitable and therefore a beam current sensor is required to set the beam current at cut-off such that it can be used as a reference for brighter signals. This function is provided by TV51 together with TV80 and ICTDA3506 on the main board. This IC produces 3 lines at low beam current just before the start of every frame scan. The amount of beam current during these 3 lines is monitored by the voltage drop in RV53 and fed back through RV54 to the IC TDA3506 pin 26. This is compared with the reference voltage internally and the result is the shifting of the DC level of the output signal (input to the video amplifier) accordingly, just before the start of every scan.

VIDEO PROCESSING

The IC IV01 TDA3506 performs this function. It provides brightness and contrast for all signals and saturation control for composite signal via (R–Y), (B–Y) at pins 17, 18. The signal switching between composite input and RGB input (pins 12, 13, 14) is by the voltage at pin 11, OV and 2V respectively.

The luminance signal is fed through the delay line VV01 and matching circuitry TV04, RV33, RV34, RV04, CV19 to pin 15 of the IC. This is used for the matrix to obtain RGB signals from the composite signal.

The cut-off detector of the tube is by pin 26. Internally, however, the IC receives the combined line and frame pulses from the circuitry RB01, CB01, DB01, RB02, RB03, DB01, RB04, RB06, RB06, RB05 to pin 10. This is used to control the counter for the correct timing to produce the 3 reference lines (refer to video output stage).

PV01, PV02 and PV03 are the gain control for the RGB output signals, hence setting of the white balance.

A beam current limiter is included in the IC. The function is such that the beam current being monitored by RL21 (pin 4 of flyback transformer) is feed back via DV02 to the brightness and contrast pins 20 and 19. Too much brightness and contrast will cause a high beam current to flow and voltage at pin 4 of FBT to go negatively, thus clamping the cathodes of DV01 and DV02 to limit the maximum beam current allowable. Hence, the maximum beam current in the tube is controlled by RL21.

PV04 is for saturation control in PAL mode and it functions also as an intensity level control in RGBI mode. The capacitors CV13, CV14, CV15, CV07, CV06, CV08 are for clamping purposes.

SOUND AMPLIFIER

The sound stage utilises the ICIS01 TCA 830 SM. The supply of which is tapped from the flyback transformer, pin 10. As the amount of current drawn from the supply varies with the output power, an additional circuitry is required to prevent the picture size to vary with the sound.

This stabilizing circuit consists of transistor TS01, BC639, DS01, RS01, RS02 and RS03. The purpose of it is to absorb current when there is no sound input.

The sound input is coupled via CS01 and volume control PS01 to pin 6 of the IC. Pin 8 is the output. The surrounding components are mainly for the frequency response.

PAL/RGBI MODULE

INPUT PROCESSING

This module enables the set to operate with either RGBI or PAL signal. Voltage supply for RGBI mode is by the regulation network that comprises of TI04, DI09, RI30 and CI06, whereas for PAL it is tap directly from the 13V rail. Selection of each mode is done by a switch on the front panel with switch at RGBI position, pin 1 of module is set to 2V by RV21, RV22, RV35 and RV36 on the main board. This enables the video processing IC TDA 3506 to accept RGB signals of 1Vp-p.

Due to the input requirements of TDA 3506, the RGBI signals from the computer (pins 6, 8, 10 & 15 of module) must be transformed into RGB signals of 1Vp-p. This is done by IC01 SN7407 and its surrounding components. The intensity signal (pin 5 of module) is integrated into the 3 RGB signals and together with the loading resistors RV12, RV13 and RV14 on the main board, RGB signals of 1Vp-p are obtained for the video processing IC TDA 3506. PV04 from the main board is wired to pin 13 of module, and together with transistor TI01, it controls the level of intensity from zero to maximum.

An additional feature of the module enables brown colour wherever the computer produces red and green signals only. This is done by IC02 SN7420 (Dual 4 input NAND gates) and transistor TI02. The task is to reduce the green output level by RI21 and DI06 when the correct combination appears at the input lines.

Picture synchronization is achieved by IL01 TEA 2017 on the main board, and it accepts only composite synchronization pulses. Hence, the separate horizontal and vertical pulses from the computer have to be combined before being fed to IL01. This is done by transistor TI03. In order to obtain a bigger range of starting position for the display, the horizontal pulses is shaped and made variable in position by the monostable multivibrator IC03 SN74LS123. The RC network controlling this is at pin 15 of IC03 and is wired directly to PV07 on the main board. Transistors TI05 and TI06 differentiate the horizontal pulse to allow only negative spikes into pin 3 of IC03, this is to avoid any false triggering of the multivibrator.

Consider now the switch at PAL position, a voltage at BA01 drives transistor TI10 into saturation, as such pin 1 of module is pulled to OV and the video processing IC TDA 3506 is switched to composite mode. At the same time, DI17, DI22 to DI25 are activated and the signals of synchronization and RGBI from the 'D' connector are inhibited.

The chroma signal is fed to pin 1 of the PAL decoder IC, IC04 AN5620. Here, the signal is processed with the burst gate pulse at pin 3 and the line retrace pulse at pin 12. The outcome is the colour difference signals (R-Y) and (B-Y) at pins 14 and 15 of module. This is in turn supplied to the video processing IC TDA3506 at pins 17 and 18 for matrixing into RGB signals suitable to drive the video amplifier.

Synchronization signal for the PAL mode is wired to BV01 on the main board and fed directly to IL01 TEA2017.

SET	TUBE REF
C1901 (0.43mm Dot Pitch)	M34JGT60x13 (N)
C1901 (0.39mm Dot Pitch)	M34JAW13x39

IV 01 TDA 3506

IL 01 TEA 2017

IP 01 TDA 4601

3952127.001 PAL / RGB1 MODULE

D SUB CONNECTOR

DESIGNATION	PIN NO
CHASSIS GROUND	1
	2
SYNC (VERT)	9
SYNC (HORZ)	8
INTENSITY	6
RED IN	3
GREEN IN	4
BLUE IN	5

A0 13V
A1 24V
* A2 112V
A3 200V

TEST POINT / WAVE FORM

SAFETY PARTS
Components designated by safety symbol should when necessary for repair only be replaced by orignal parts produced and approved by the manufacturer only then can the original operantional safety be guaranteed.

DISC CERAMIC CAPACITOR
POLYESTER / MYLAR CAPACITOR
ELECTROLYTIC CAPACITOR
ALL CAPACITANCES ARE IN FARAD UNLESS OTHERWISE STATED.

CONTRAST
BRIGHTNESS
VOLUME

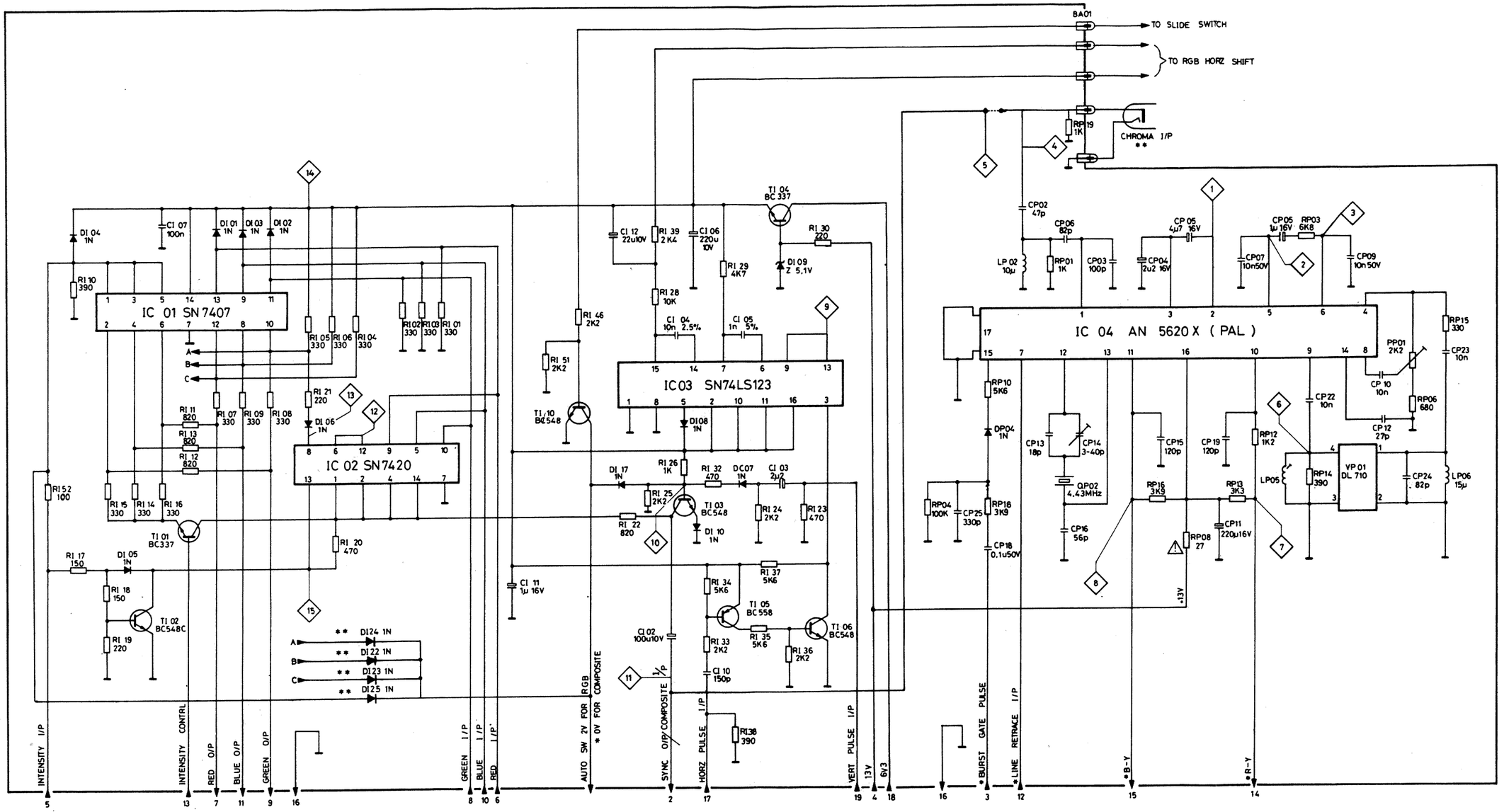
VERT FREQ
VERT HEIGHT
HORZ PIC SHIFT

1N 1N4148

2 Vpp 750V
3 H. Vpp 1.46V
5 V. Vpp 0.86V
7 H. Vpp 3.5V
8 H. Vpp 3.75V
9 H. Vpp 11.8V
10 V. Vpp 4.6V
12 V. Vpp 0.6V
13 H. Vpp 860V
14 H. Vpp 65V
15 Vpp 13.5V
18 H. Vpp 40V
19 H. Vpp 40V
20 H. Vpp 43V
21 H. Vpp 15V

SCHEMATIC DIAGRAM

COMMODORE Video – Monitor 1901



CAPACITOR

- DISC CERAMIC CAPACITOR
- POLYESTER / MYLAR CAPACITOR
- ELECTROLYTIC CAPACITOR

ALL CAPACITANCES IN FARAD.

RESISTORS

CARBON RESISTOR 0.25W TOL ± 5%

ALL RESISTANCES IN OHM.
UNLESS OTHERWISE STATED.

⚠ SAFETY PARTS
COMPONENTS DESIGNATED BY SAFETY SYMBOL SHOULD, WHEN NECESSARY FOR REPAIR, ONLY BE REPLACED BY ORIGINAL PARTS PRODUCED AND APPROVED BY THE MANUFACTURER, ONLY THEN CAN THE ORIGINAL OPERATIONAL SAFETY BE GUARANTEED.

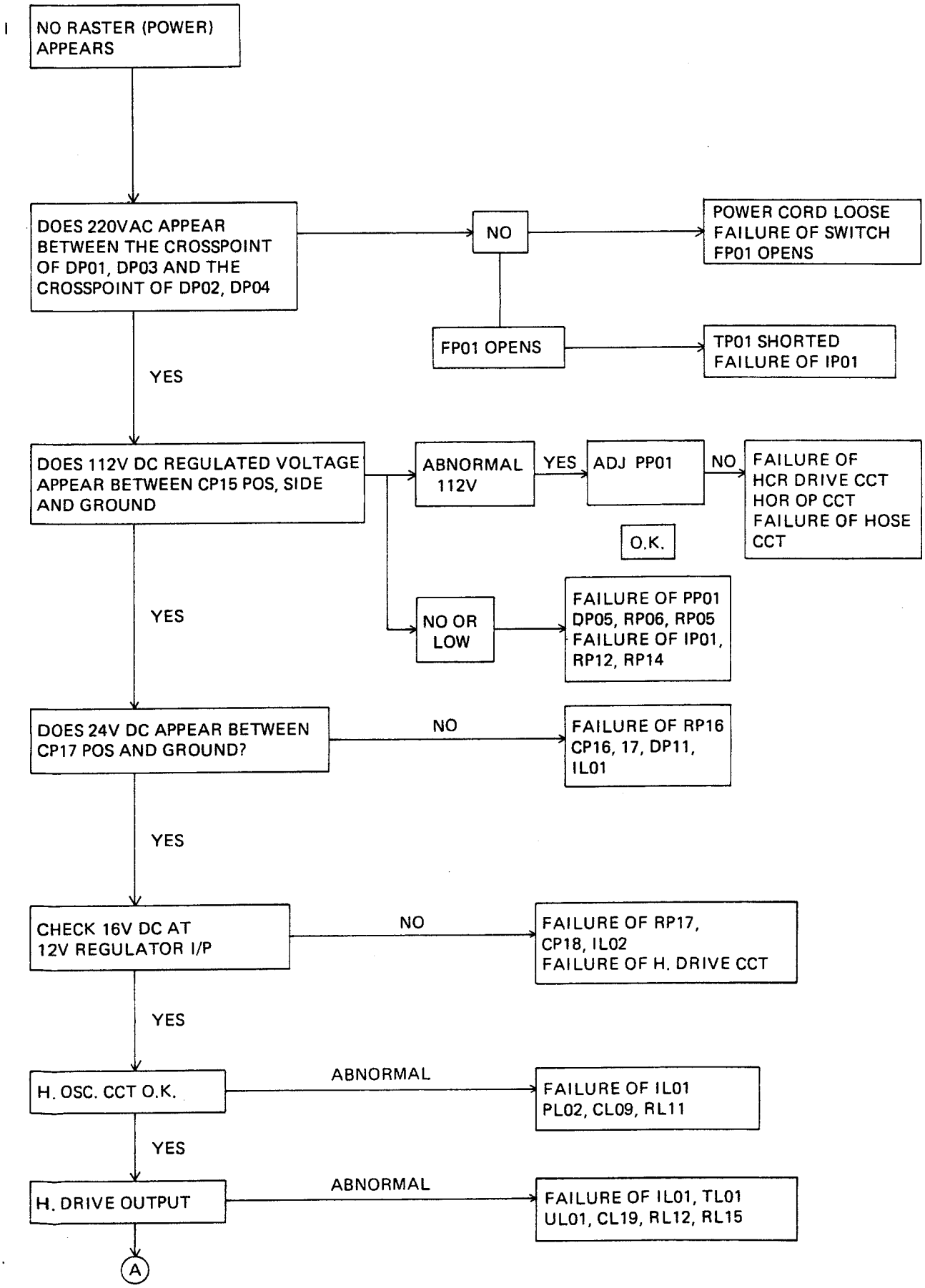
1N 1N4148

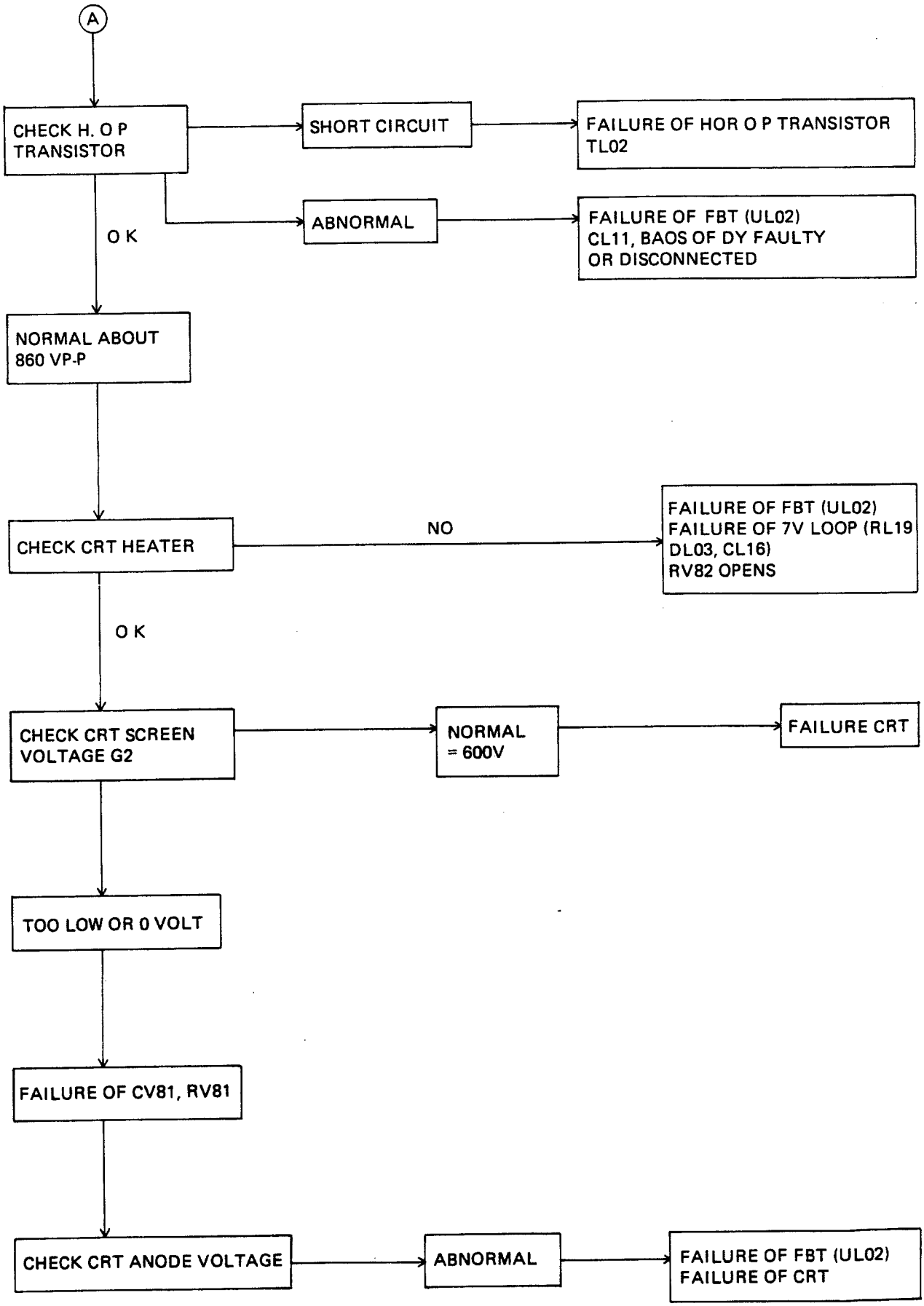
TEST POINT

* FOR COMPOSITE VIDEO

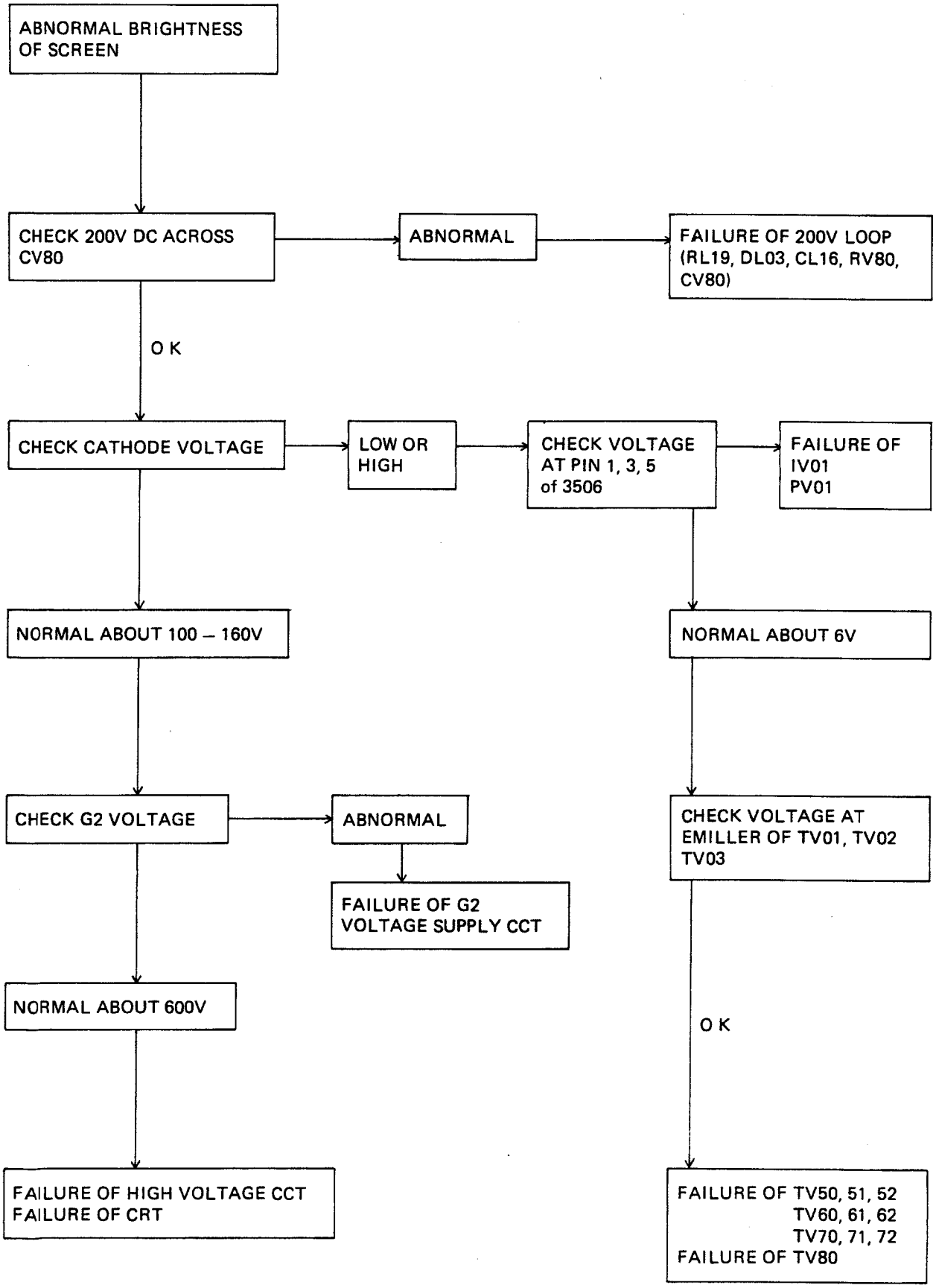
SCHEMATIC DIAGRAM FOR PAL/RGBI MODULE

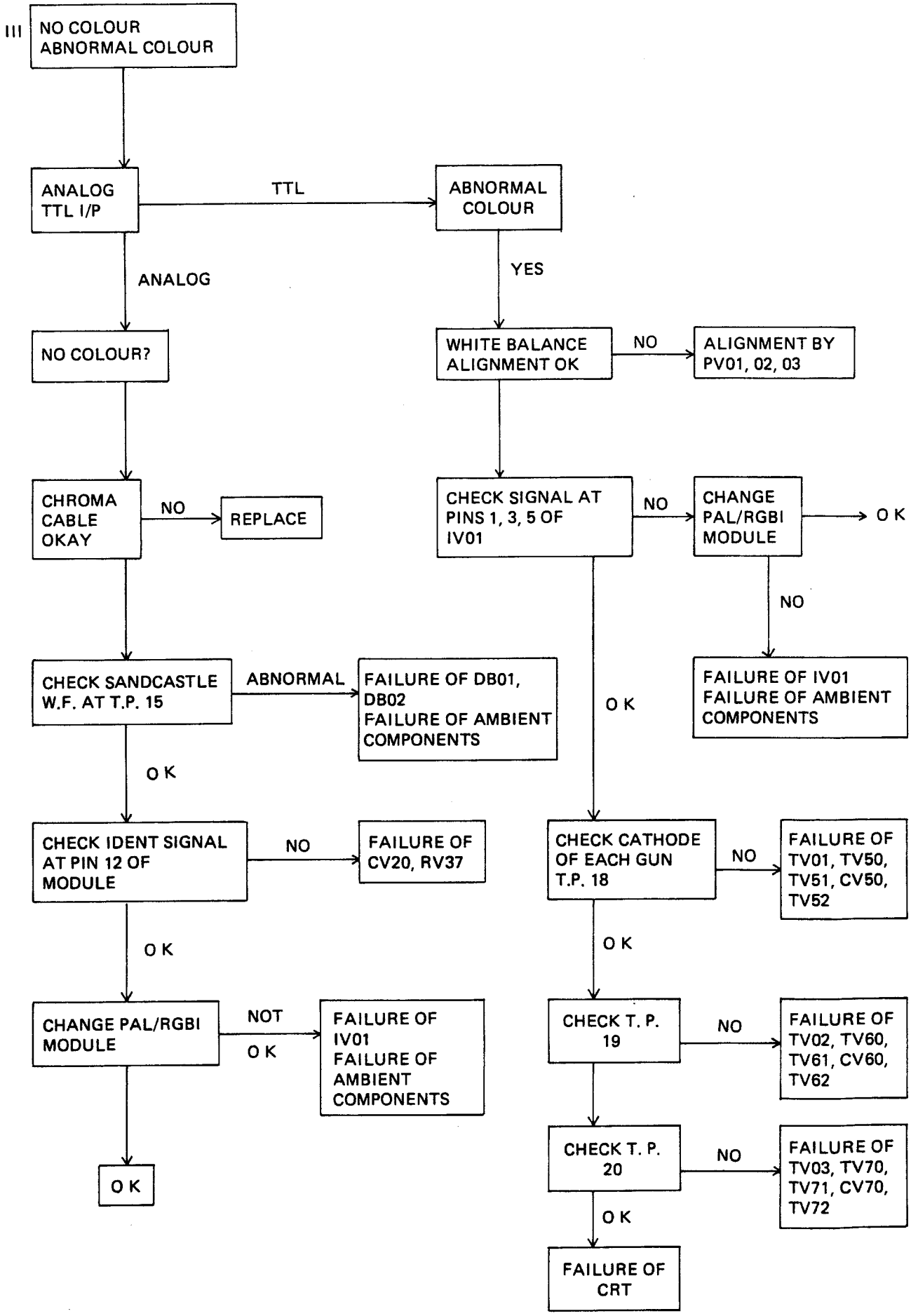
TROUBLE SHOOTING

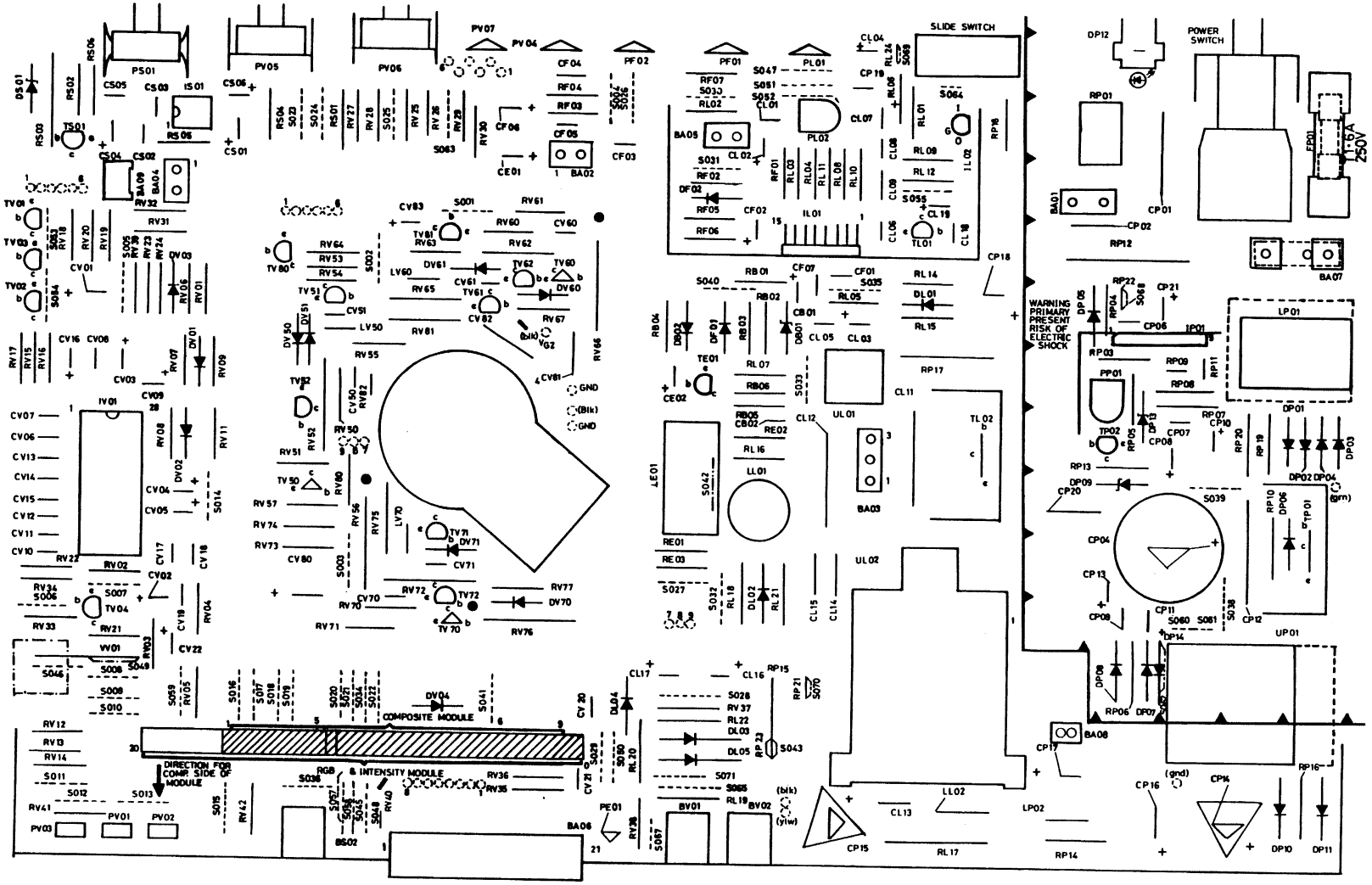

NO RASTER (POWER) APPEARS
DOES 220VAC APPEAR BETWEEN THE CROSSPOINT OF DP01, DP03 AND THE CROSSPOINT OF DP02, DP04
NO
POWER CORD LOOSE
FAILURE OF SWITCH FP01 OPENS
FP01 OPENS
TP01 SHORTED
FAILURE OF IP01
YES
DOES 112V DC REGULATED VOLTAGE APPEAR BETWEEN CP15 POS, SIDE AND GROUND
ABNORMAL 112V
YES
ADJ PP01
NO
FAILURE OF HCR DRIVE CCT HOR OP CCT FAILURE OF HOSE CCT
O.K.
YES
NO OR LOW
FAILURE OF PP01 DP05, RP06, RP05 FAILURE OF IP01, RP12, RP14
DOES 24V DC APPEAR BETWEEN CP17 POS AND GROUND?
NO
FAILURE OF RP16 CP16, 17, DP11, IL01
YES
CHECK 16V DC AT 12V REGULATOR I/P
NO
FAILURE OF RP17, CP18, IL02 FAILURE OF H. DRIVE CCT
YES
H. OSC. CCT O.K.
ABNORMAL
FAILURE OF IL01 PL02, CL09, RL11
YES
H. DRIVE OUTPUT
ABNORMAL
FAILURE OF IL01, TL01 UL01, CL19, RL12, RL15
A


A
CHECK H. O P TRANSISTOR
SHORT CIRCUIT
FAILURE OF HOR O P TRANSISTOR TL02
ABNORMAL
FAILURE OF FBT (UL02) CL11, BAOS OF DY FAULTY OR DISCONNECTED
O K
NORMAL ABOUT 860 VP-P
CHECK CRT HEATER
NO
FAILURE OF FBT (UL02) FAILURE OF 7V LOOP (RL19 DL03, CL16) RV82 OPENS
O K
CHECK CRT SCREEN VOLTAGE G2
NORMAL = 600V
FAILURE CRT
TOO LOW OR 0 VOLT
FAILURE OF CV81, RV81
CHECK CRT ANODE VOLTAGE
ABNORMAL
FAILURE OF FBT (UL02) FAILURE OF CRT

II

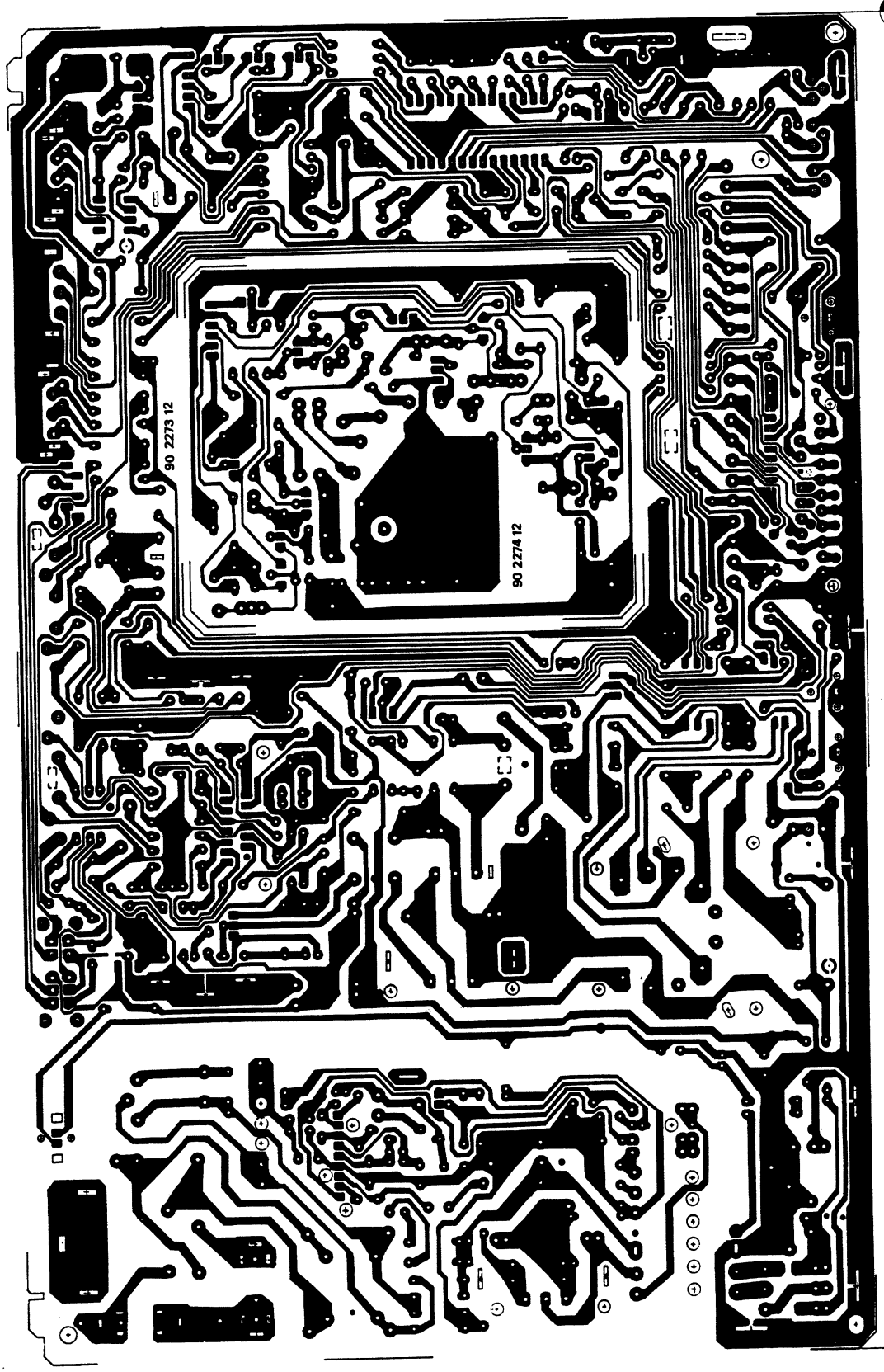

ABNORMAL BRIGHTNESS OF SCREEN
CHECK 200V DC ACROSS CV80
ABNORMAL
FAILURE OF 200V LOOP (RL19, DL03, CL16, RV80, CV80)
O K
CHECK CATHODE VOLTAGE
LOW OR HIGH
CHECK VOLTAGE AT PIN 1, 3, 5 of 3506
FAILURE OF IV01 PV01
NORMAL ABOUT 100 – 160V
NORMAL ABOUT 6V
CHECK G2 VOLTAGE
ABNORMAL
CHECK VOLTAGE AT EMILLER OF TV01, TV02 TV03
FAILURE OF G2 VOLTAGE SUPPLY CCT
NORMAL ABOUT 600V
O K
FAILURE OF HIGH VOLTAGE CCT FAILURE OF CRT
FAILURE OF TV50, 51, 52 TV60, 61, 62 TV70, 71, 72 FAILURE OF TV80


III
NO COLOUR
ABNORMAL COLOUR
ANALOG
TTL I/P
TTL
ABNORMAL COLOUR
ANALOG
YES
NO COLOUR?
WHITE BALANCE ALIGNMENT OK
NO
ALIGNMENT BY PV01, 02, 03
CHROMA CABLE OKAY
NO
REPLACE
CHECK SIGNAL AT PINS 1, 3, 5 OF IV01
NO
CHANGE PAL/RGBI MODULE
O K
NO
CHECK SANDCASTLE W.F. AT T.P. 15
ABNORMAL
FAILURE OF DB01, DB02
FAILURE OF AMBIENT COMPONENTS
FAILURE OF IV01
FAILURE OF AMBIENT COMPONENTS
O K
O K
CHECK IDENT SIGNAL AT PIN 12 OF MODULE
NO
FAILURE OF CV20, RV37
CHECK CATHODE OF EACH GUN T.P. 18
NO
FAILURE OF TV01, TV50, TV51, CV50, TV52
O K
O K
CHANGE PAL/RGBI MODULE
NOT O K
FAILURE OF IV01
FAILURE OF AMBIENT COMPONENTS
CHECK T. P. 19
NO
FAILURE OF TV02, TV60, TV61, CV60, TV62
CHECK T. P. 20
NO
FAILURE OF TV03, TV70, TV71, CV70, TV72
O K
O K
FAILURE OF CRT

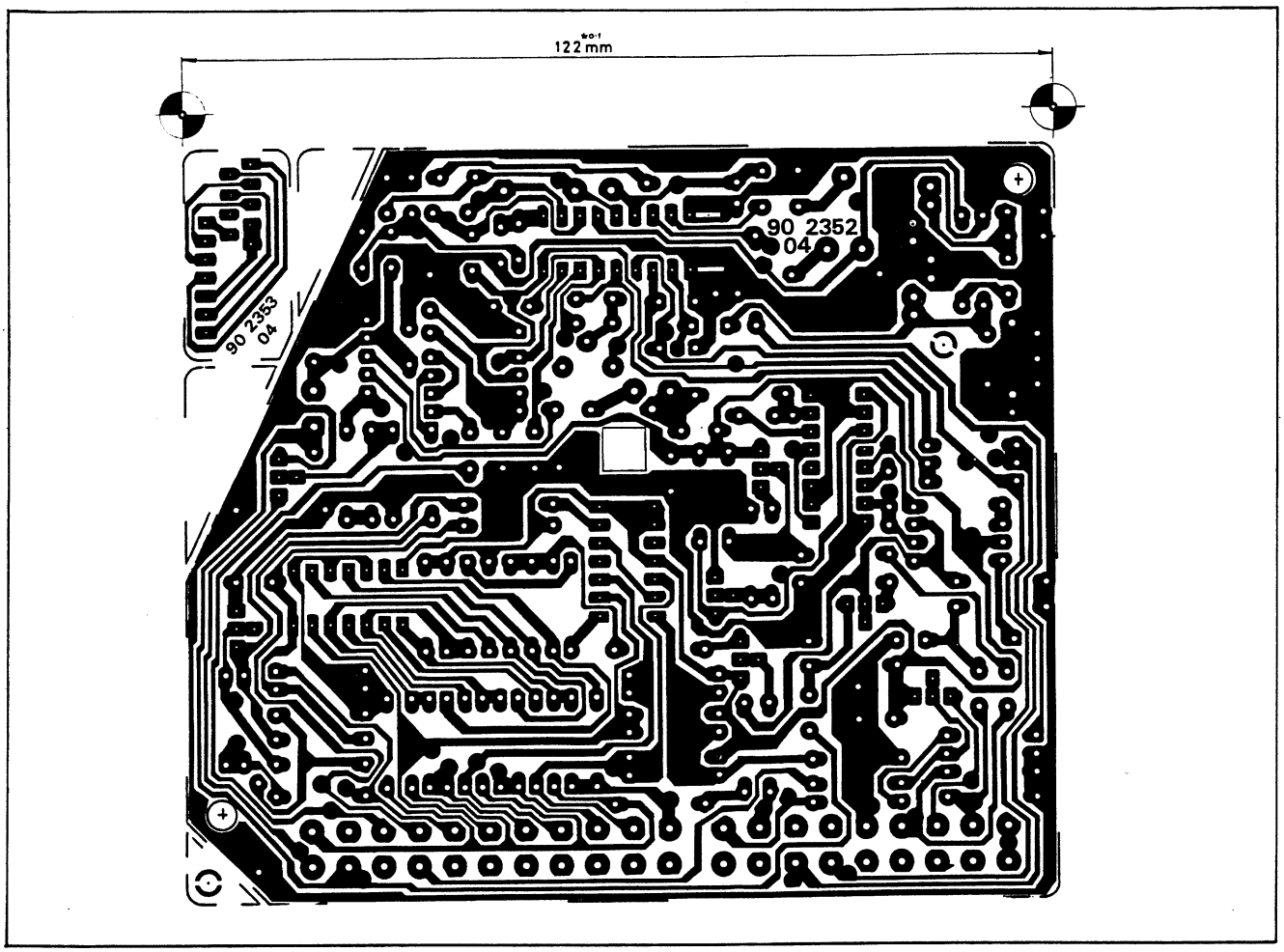


MAIN PC BOARD LAYOUT (COMPONENT REGISTRATION)

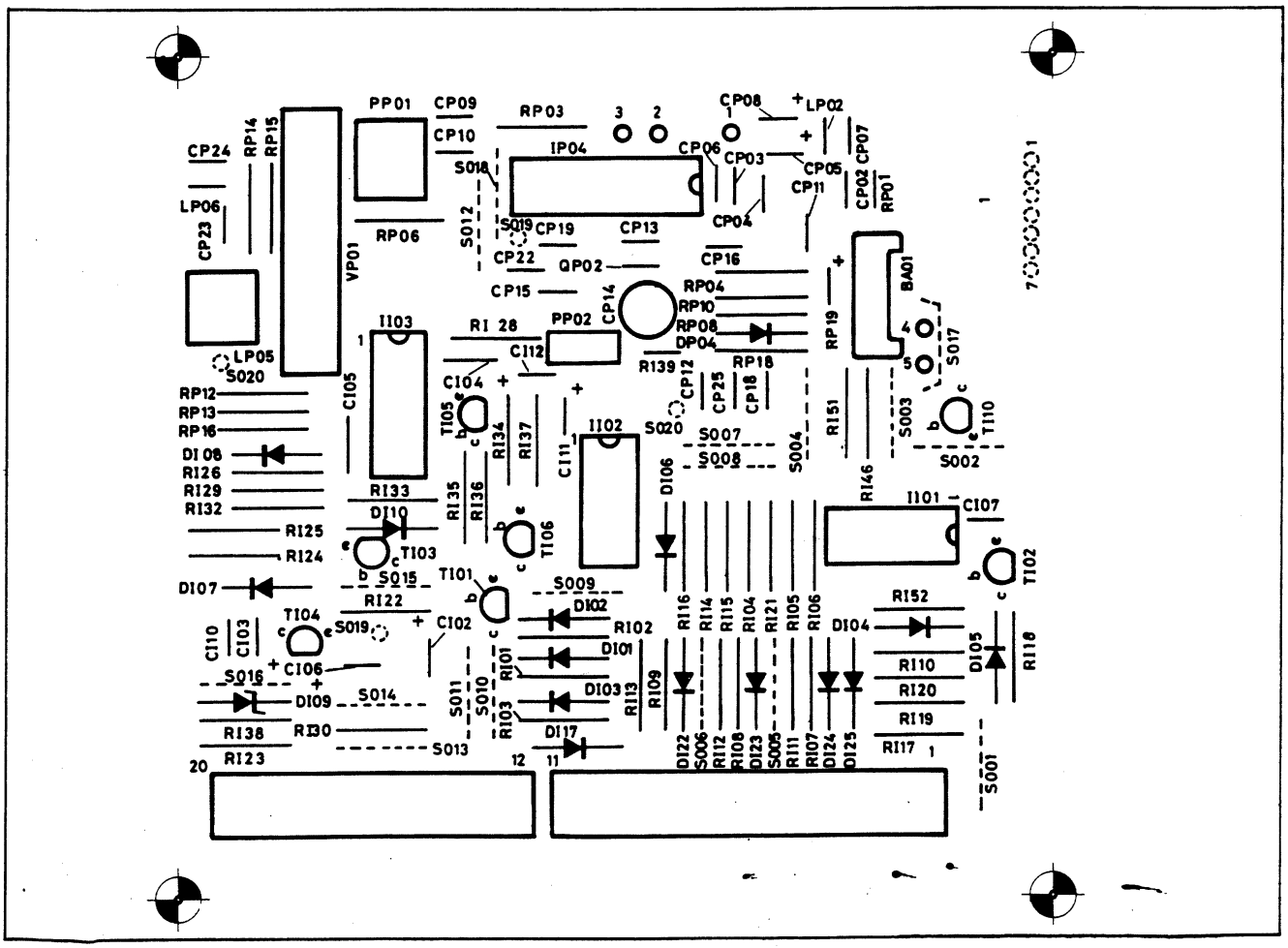
MAIN PC BOARD LAYOUT (COPPER TRACK)



PAL/RGBI MODULE COPPER TRACK



PAL/RGBI MODULE (COMPONENT REGISTRATION)



SPECIAL PARTS

MAIN PB ASSY

Position No.	Part Description	Rating	Order Code
CL 09	Polypropylene cap	10 NF 2.5%	2.260163001
CL 11	Polypropylene cap	8.2 NF 3.5% 1.6K	2.260159001/2/3
CL 12	Metallized Polypropylene	360 NF 250 VK	2.26.0168001/2
DL 02	Diode	BA 157	2.300177001/3
DL 03	Diode	BY 296	2.300176001/3
DL 04	Diode	BA 157	2.300177001/3
DP01 to DP04	Rectifying diode	RL 256	2.300304.00.1
FP 01	Fuse	T 1.6A 250V	2.53.0023.00.2/5
IL 01	IC	TEA 2017	2.320187.00.1
IL 02	IC	78 L 12 A	2.32.0153.002
IP 01	IC	TDA 4601	2.32.0205.001
IP 01	IC	TDA 4601 D	2.32.033300.1
IV 01	IC	TDA 3506	2.32.0118.00.1
M0050	Picture Tube	Med. Res. 0.39mm	2.50.0051.00.1
M0050	Picture Tube	Med. Res. 0.43mm	2.50.0036001
M0020	Power Switch	70060 - 017	2.55.1165.00.1
PL 02	Horz. Preset	2 K2	2.230132001
UL 02	FBT	Split diode	2.42.0116.021
UP 01	Sw mode transformer	–	2.42.0141.021
RL 11	Carbon film resistor	11 KR 1/4W	2.203147051/2/3
RL 16	Fusible resistor	1 KR ± 10% 0.5W	2.22.0047.021
RL 18	Fusible resistor	39 R ± 10% 0.35W	2.220046.02.1
RL 19	Fusible resistor	0.22 R ± 10% 0.4W	2.220050.02.1
RL 20	Fusible resistor	1 R ± 50% 0.5W	2.220033.00.1
RP 16	Fusible resistor	0.22 R ± 10% 0.4W	2.220050.02.1

CRT PB ASSY

RV 55	Carbon film resistor	1.2 KR ± 5% 0.5W	2.200233054
RV 57	Fusible resistor	1 KR ± 5% 0.3W	2.22.0092.00.1
RV 65	Carbon film resistor	1.2 KR ± 5% 0.5W	2.200233054
RV 67	Fusible Resistor	1 KR ± 5% 0.3W	2.22.0092.00.1
RV 75	Carbon film resistor	1.2 KR ± 5% 0.5W	2.22.0092.00.1
RV 77	Fusible Resistor	1 KR ± 5% 0.3W	2.22.0092.00.1
TV 50	Transistor	2 SC 2611	2.31.0082.00.1
TV 60	Transistor	2 SC 2611	2.31.0082.00.1
TV 70	Transistor	2 SC 2611	2.31.0082.00.1